Organizational structures for external growth of University Technology Transfer Offices: An explorative analysis

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ABSTRACT

Despite the increasing attention to university-industry technology transfer, limited emphasis has been posed on how the university offices in charge of this task organize themselves to grow. University Technology Transfer Offices (UTTOs) can grow internally, e.g. expanding their staff, or externally, e.g. pooling resources among different UTTOs creating new organizational structures. In this paper we study the latter. Exploiting the opportunity of a specific technology transfer policy introduced in Italy, we develop six in-depth case-studies, encompassing twenty UTTOs. We identify three organizational structures that are adopted by UTTOs to achieve external growth. In discussing antecedents, advantages and disadvantages of each organizational structure, we derive implications for UTTOs' managers and policy makers.

1. Introduction

The important role played by University Technology Transfer Offices (UTTOs) has been widely acknowledged by academic research and practitioners (e.g. Comacchio et al., 2012; Lee, 1996; Siegel et al., 2003). Being responsible for a large amount of knowledge creation, universities play a key role in the innovation systems (Leten et al., 2014; Rasmussen et al., 2006) and UTTOs can be important in bringing such new knowledge to an upper level of economic exploitability (Auerswald and Branscomb, 2003; Barr et al., 2009).

The main efforts in the literature have been directed toward disentangling effective methods and models of University Technology Transfer (UTT) and toward the identification of the conditions and practices under which university-industry technology transfer is effectively accomplished (e.g. Hsu et al., 2015; Siegel et al., 2004; Anderson et al., 2007). In this framework, the effort in trying to identify the specific tasks of UTTOs and the effectiveness of UTT has led to a focus on topics as intellectual property (IP) creation, recognition and evaluation (Jensen et al., 2003; Leydesdorff and Meyer, 2013; Siegel et al., 2003); licensing and execution of IPs developed in universities (e.g. Bray and Lee, 2000; Powers and McDougall, 2005); and the creation of spinoffs and start-ups (Bercovitz and Feldmann, 2006; O'Shea et al., 2005). All these studies have been driven, in particular, by the desire to provide useful insights to practitioners and policy makers and by the desire to understand how UTTOs performances are driven and how to boost them.

Less attention has been paid to the UTTOs as organizations. Even if some scholars suggest that the limitations that UTTOs may have in their operations are largely organizational (Siegel et al., 2007), the majority of the studies have focused on the practices they adopt (e.g., Siegel et al., 2003; Debackere and Veugelers, 2005) or the incentives on UT-TO's performance (e.g., Friedman and Silberman, 2003; Link and Siegel, 2005). Few contributions have considered the organizational structures of the TTOs (e.g., Bercovitz et al., 2001; Brescia et al., 2016). Furthermore, among the organizational research about UTTOs, to the best of our knowledge there are no studies focused on understanding the relationships and collaborations that can arise between different UTTOs and their external growth. Most scholars, when adopting an organizational perspective to study UTTOs, have focused on other topics, such as the exploitation by TTOs of their human capital to rise performance (Swamidass and Vulasa, 2009), the importance of having or not an internal UTTO for the diffusion of the knowledge developed inside the university (Bozeman, 2000), the usefulness of having a vertical integrated UTTO rather than to outsource technology transfer activities to more specialized external parties (Fisher and Atkinson-Grosjean, 2002), or the relationships and the organizational forms of UTTOs and the organizational relationships among UTTOs and administrative offices in academia (Bercovitz et al., 2001; Brescia et al., 2016). Even when a focus on organizational structures was used, UTTOs have been mostly considered by scholars as single entities operating in a complex environment composed by firms, governments and academies (Audretsch et al., 2002), avoiding the analysis of the relationships and

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collaborations among different UTTOs. Collaborations can be important for UTTOs because, as their parent universities develop relationships among them, so their TTOs can build connections to share practices, administrative knowledge and routines related to knowledge management. Indeed, in many countries these relationships are maintained through national associations (e.g. the "Association of University Technology Managers" – AUTM - in USA or the "Network per la Valorizzazione della ricerca" – NETVAL - in Italy); other times these connections are direct between UTTOs.

The way in which UTTOs choose to configure the relationships with other UTTOs may affect some important features such as the sharing of knowledge and practices or the possibility to reach a broader array of opportunities, allowing the growth of UTTOs involved in the collaborations.

For this reason, and given the gap in the literature, we aim at answering the following research question: how do UTTOs organize themselves to achieve external growth?

To answer to this question, we explore the organizational forms developed by 20 UTTOs to manage their relationships. We take the opportunity given by a founding program of the Italian Ministry of University and Research, started in 2006, which gave funds to UTTOs willing to organize structured relationships with other university TTOs to grow. We identify three possible external organizational structures that can be created by UTTOs and we discuss them highlighting antecedents, advantages and disadvantages of each structure.

The remainder of the paper is structured as follows. The second section presents the relevant literature about the internal organizational models of TTOs and the reasons and benefits that bring organizations to cooperate. The third section presents the research framework and the research methodology. Then the results section evidences the organizational structures for external growth adopted by UTTOs. The discussion section analyses the antecedents, the advantages and disadvantages of each organizational structure. The last section draws conclusions and implications of this study.

2. Literature review

2.1. The internal organization of UTTOs

Technology transfer's outcome is strongly influenced by an array of organizational practices that are directly linked with the different motives, incentives and organizational cultures that stakeholders involved in this activity have (Siegel et al., 2003). In this vein the organizational structure assumed by UTTOs has a direct impact on the amount of knowledge and on technologies transferred (Brescia et al., 2016).

A first relevant study published on this issue (Bercovitz et al., 2001) analyses the organizational structure of Duke, Johns Hopkins and Pennsylvania State University's Technology Transfer Offices in the USA. In this work, four distinct structures that UTTOs can assume are proposed on the basis of the organizational forms identified in Chandler (1990) and Williamson (1975, 1985) studies on modern business enterprise. Discussing advantages and drawbacks of each form, Bercovitz and colleagues link attributes of organizational forms (as information processing capacity, coordination capability and incentive alignment) to technology transfer outcomes, concluding that the best structure is a semi-centralized one, that is a structure in which the TTO is divided in semi-autonomous divisions, with different responsibilities, that are managed by a central office with high decisional power. They suggest that this could be the best structure because it involves divisional tasks promoting high coordination capability, high information processing capacity and a good incentive alignment among divisions.

The potentiality of decentralized structures (i.e. those in which the tasks are distributed among several distinct units operating autonomously) has been highlighted also by Litan et al. (2007) and by Carlsson et al. (2008), who have focused their attention on IP-management tasks. Litan et al. highlighted that centralized structures (i.e. a structure in

which decision-making and coordination responsibilities lie with a small team of top executives and that can be both functionally departmentalized or not) do not lead UTTOs to be facilitator of technology commercialization, but act as configurations that transform the UTTO in a sort of administrative intermediary that brings the technology a small step closer to the market. Furthermore, they underlined that, even if centralized structures are more effective in managing and maintaining patent expertise, semi-centralized structures have an advantage compared to them since they are more prone to answer quickly and effectively to peripheral needs, thanks to the role exerted by divisions. Another positive feature of semi-centralized structures is that they do not suffer from the problems associated with divisional structures, which are slow and ineffective in finding synergies across divisions[1].

The potential of divisional structures has been described also by Debackere and Veugelers (2005) who argued that a specialized and decentralized Technology Transfer Office within the university is instrumental to ensure a sufficient level of autonomy for the development of relations with industry. This is also useful to avoid conflicts of interests among the missions of the modern entrepreneurial universities: teach, research, commercialize (Etzkowitz and Leydesdorff, 2000).

Another key-role in organizational studies is played by the governance of TT activities. These can be directly in the hands of the university (through internal UTTOs) or in the hands of third external parties (the TT management is ascribed to specialized societies that manage the TT activities for several customers). This organizational dualism has been described by Fisher and Atkinson-Grosjean (2002), who analysed TTOs' structure in Canada. The authors individuated two models of TTO: an internal model, where the office is fully integrated into the university's structures, and the external model, where the office operates outside the university either as a non-profit or a for-profit corporation. Moreover, even if the large majority of TTOs are internal (according to Thursby et al. (2001)), only the 15% of U.S. TTOs are external and only the 4.8% are for-profit.

A further classification of organizational TTO's models, based on the analysis of some European experiences (Campbell et al., 2007), adds to a binary subdivision (internal vs external) a hybrid structure composed by an internal TTO and some external organization. The former has the main objective of supporting research and development in addition to technology and knowledge diffusion; while the latter is focused on specific scientific fields that are more flexible and that have as first objective income generation.

In the end, organizational structures of UTTOs mainly depend on two predominant choices that universities have to make: the first is to keep the TTO internal or external to the university; the second is about which organizational structure confer to the office.

2.2. The external growth of UTTOs

While internal organizational settings of UTTOs have received some attention in the literature (e.g. Siegel et al., 2003; Dill, 1995; Friedman and Silberman, 2003), external growth of UTTO appears to be an almost completely underdeveloped topic.

External growth of UTTOs happens when two or more offices decide to cooperate and to collaborate to achieve one or more purposes that they have in common. Such collaborations are not strictly linked to the achievement of a particular objective, but may be based on other reasons, such as the willingness to exchange practices, to share critical resources on specific tasks, or to exploit opportunities far from the core domain of competences of UTTOs involved in (e.g. the licensing of a technology developed in the university which is not properly belonging to its core domain).

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[1] Kono and Clegg (2001) and Legerer et al. (2009) to describe the semi-centralized structure and the centralized structure use the terms hybrid divisional structures and pure divisional structures.